NAVSEA
STANDARD ITEM

FY-20

ITEM NO: 009-12
DATE: ***01 OCT 2018***
CATEGORY: II

1. SCOPE:

1.1 Title: Weld, Fabricate, and Inspect; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-1689, Fabrication, Welding, and Inspection of Ships Structure

2.3 American Bureau of Shipping (ABS) Rules for Building and Classing Steel Vessels

2.4 0900-LP-060-4010, Fabrication, Welding, and Inspection of Metal Boat and Craft Hulls

2.5 S9074-AQ-GIB-010/248, Requirements for Welding and Brazing Procedure and Performance Qualification

2.6 0900-LP-001-7000, Fabrication and Inspection of Brazed Piping Systems

2.7 S9074-AR-GIB-010/278, Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels

2.8 MIL-STD-22, Welded Joint Design

2.9 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.10 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.11 DOD-STD-2185, Requirements for Repair and Straightening of Bronze Naval Ship Propellers

2.12 S9221-C1-GTP-010/020, Main Propulsion Boilers; Repair and Overhaul

2.13 S9AA***0***-AB-GOS-010, General Specifications for Overhaul of Surface Ships (GSO)

2.14 MIL-STD-2191, Repair, Welding, Weld Cladding, Straightening, and Cold Rolling of Main Propulsion Shafting

2.15 S9CGO-BP-SRM-010/CG-47CL, Technical Manual for CG-47 Class, Superstructure Cracking Repair

2.16 DM 10-623, SERMC, Quality Assurance Requirements for Welding 5XXX Series Aluminum Structures for CG-47 Class

3. REQUIREMENTS:

3.1 Utilize specific requirements of 2.2 through 2.12 listed in Tables One, 2, 3, and 4 of this item for determining the welder and brazer qualifications, electrodes, weld design, welding requirements, brazing requirements, welding procedures, brazing procedures, welding parameters and controls, inspection standards, and acceptance criteria.

3.1.1 Maintain a Welding Workmanship Program and a Welding Surveillance Inspection Program if conducting structural and fabrication work in accordance with 2.2.

3.1.2 Maintain a Welding Training Program in accordance with 2.5. |

3.1.3 Maintain a Brazing Process Inspection in accordance with 2.6.

3.2 Weld bell-end fittings in accordance with Section 505c8 of 2.13. Nondestructive testing inspection ***must*** comply with Class P-2 piping systems as defined by 2.7.

3.3 Ground welding machines, for purposes of providing a return path for welding current, using a grounding bar or lead which ***must*** be connected directly from the machine ground return connection to the ship's hull, sized on the basis of 1,000,000 Circular Mils per 1,000 amps per 100 feet, but in no event using less than a Number One cable (85,037 Circular Mils).

3.3.1 Welding machines used for welding on machinery, pressure vessels, or piping, rotating ordnance, electronic, or fire control equipment ***must*** have the ground return connection in the immediate vicinity of the work to ensure that current does not flow through bearings, pipe hangers, or other areas where arcing or high resistance paths exist. For ships constructed of non-magnetic materials, the ground return cables ***must*** be connected directly to the component being welded - as close to the weld zone as feasible.

3.3.2 Shipboard power distribution system ***must*** not be used as the power source for welding equipment unless approved by the SUPERVISOR. External power source ***must*** be used.

3.4 Accomplishment of a Process Control Procedure (PCP) for the specific welding, brazing, and inspection operations in 3.4.1 through 3.4.9 ***must*** be in accordance with NAVSEA Standard Items (See Note 4.1) and the following:

3.4.1 Class A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1, and T-1 welding, as defined by 2.7. These procedures ***must*** include, as a minimum, the information required by Paragraph 4.1.3 of 2.7 and supporting data such as a sketch of the weld repair areas and associated ship components. Joint numbers ***must*** not be duplicated on ship during the availability.

3.4.2 Class P-3a special category silver brazing, as defined by 2.6. The procedure ***must*** include, as a minimum, the information required by Sections 4 of 2.5.

3.4.2.1 All brazing of steam piping ***must*** conform to 2.6, Class P-3a special category, including ultrasonic inspection, for all pipe sizes .840 inch outer diameter or grater including any (existing) copper to (new) copper-nickel transition joints. Brazed joints ***must*** not be used in steam pipe sizes less than .840 inch outer diameter.

3.4.2.2 In steam systems, where brazed piping and fittings are to be reused, or piping has to be sized to achieve proper fit-up, the option for a 5X visual inspection for cracks listed in Sections 5.5.3, 5.10.1, and 5.10.2 of 2.6 ***must*** not be used; liquid penetrant inspection ***must*** be required.

3.4.3 For bronze propellers, using 2.11 for guidance.

3.4.4 For propellers other than bronze, using 2.7 for guidance.

3.4.5 For propulsion shafting and rudder stocks, using 2.14 for guidance.

3.4.6 For titanium-based materials, using 2.7 for guidance.

3.4.7 Accomplish aluminum welding and nondestructive testing for superstructure of CG-47 Class ships in accordance with 2.15 and 5XXX series aluminum structures for CG-47 class ships in accordance with 2.16.

3.5 The use of a permanent backing strap in accordance with Section 11, Paragraph 11.1 of 2.2 is prohibited unless detailed in the original weld joint design or when authorized by the SUPERVISOR.

(I) or (I)(G) "NONDESTRUCTIVE TESTING"

3.6 Accomplish nondestructive testing in accordance with the following:

3.6.1 Manufacture, installation, and repair (welding, brazing, machining, or lapping) of Level I fittings or components:

3.6.1.1 Nondestructive Testing Visual Inspection - (I)

3.6.1.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.6.1.3 Nondestructive Testing Radiographic - (I)

3.6.2 Welding/brazing of P-1, P-LT, P-3a piping systems or Class A-F, A-1, A-2, A-3, A-LT, M-1, T-1 welding, and P-2 steam service:

3.6.2.1 Nondestructive Testing Visual Inspection - (I)

3.6.2.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.6.2.3 Nondestructive Testing Radiographic - (I)

3.6.2.4 Nondestructive Testing Visual Inspection (I)(G) materials S-51, S-52, S-53.

3.6.3 Welding on ship/craft listed in Attachment A hull or structure when required by the fabrication document:

3.6.3.1 Nondestructive Testing Visual Inspection - (I)

3.6.3.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.6.3.3 Nondestructive Testing Radiographic - (I)

3.6.4 Weight handling equipment manufacture and repair:

3.6.4.1 Nondestructive Testing Visual Inspection - (I)

3.6.4.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant - (I)(G)

3.6.4.3 Ultrasonic Testing (Final Only) - (I)(G)

3.6.4.4 Nondestructive Testing Radiographic - (I)

3.6.5 Corrective maintenance within the certified boundaries of cranes (as defined in NSTM 589):

3.6.5.1 Nondestructive Testing Visual Inspection - (I)

3.6.5.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant - (I)(G)

3.6.5.3 Ultrasonic Testing (Final Only) - (I)(G)

3.6.5.4 Nondestructive Testing Radiographic - (I)

3.6.6 Maintenance on aircraft launch and recovery equipment:

3.6.6.1 Nondestructive Testing Visual Inspection - (I)

3.6.6.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.6.6.3 Nondestructive Testing Radiographic - (I)

(I)(G) "EVALUATION OF RT FILMS"

3.7 Accomplish RT film interpretation.

3.7.1 Provide the cognizant Government representative designated by the SUPERVISOR the evaluated radiographs and records within 2 days of the (G) point.

3.8 Provide and maintain a Welding Consumable Control System in accordance with 2.2, 2.3, 2.4, 2.6, 2.7, 2.11, 2.12, 2.14, and 2.16 which covers the control and issuance of filler materials. The system ***must*** be described in a written procedure that ***must*** be submitted to the SUPERVISOR for review and approval prior to the initiation of production work. This procedure only requires a one-time submittal/approval unless the Standard Items change and/or references change or are updated. The Welding Consumable Control System ***must*** be subject to periodic conformity audits by the SUPERVISOR throughout the contract period.

3.9 Utilize Attachment A to define combatant and non-combatant vessels and applicable table.

3.10 Where requirements in the repair and testing instructions for propulsion boilers conflict, 2.12 ***must*** take precedence.

4. NOTES:

4.1 If a Process Control Procedure (PCP) for all specific welding, brazing, and inspection operations in 3.4.1 through ***3.5*** is required; the use of Category II Standard Item 009-09 "Process Control Procedure (PCP); provide and accomplish" of 2.1 will be specified in the Work Item.

TABLE 1
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

LINE	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
1	WELDER AND BRAZER QUALIFICATION	S9074-AQ-GIB-010/248, SECTION 5	0900-LP-001-7000, SECTION 4	S9074-AQ-GIB-010/248, SECTION 5		S9221-C1-GTP-010/020	
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, SECTION 4	NOT APPLICABLE	S9074-AQ-GIB-010/248, SECTION 4		S9221-C1-GTP-010/020	DOD-STD-2185, SECTION 4
3	BRAZING PROCEDURE	NOT APPLICABLE	0900-LP-001-7000, SECTION 4	NOT APPLICABLE			
4	WELDING REQUIREMENTS	S9074-AR-GIB-010/278, SECTION 6	NOT APPLICABLE	S9074-AR-GIB-010/278, SECTION 6			MIL-STD-2185, SECTION 5
5	FILLER MATERIAL	S9074-AR-GIB-010/278, SECTION 5	0900-LP-001-7000, SECTION 5	S9074-AR-GIB-010/278, SECTION 5		S9221-C1-GTP-010/020	DOD-STD-2185, SECTION 5
6	JOINT DESIGN	S9074-AR-GIB-010/278, SECTION 9 MIL-STD-22	0900-LP-001-7000, SECTION 5	NOT APPLICABLE	S9074-AR-GIB-010/278, SECTION 9 MIL-STD-22	S9221-C1-GTP-010/020	

* - PARAGRAPH 3.4.4 APPLIES
** - PARAGRAPH 3.***10*** APPLIES

TABLE 1
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

LINE	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
7	HEAT TREATMENT	S9074-AR-GIB-010/278, SECTION 6	0900-LP-001-7000, SECTION 5	S9074-AR-GIB-010/278, SECTIONS 6 AND 11.6	S9074-AR-GIB-010/278, SECTION 6	S9221-C1-GTP-010/020	S9074-AR-GIB-010/278, SECTION 6 DOD-STD-2185, SECTION 5
8	WORKMANSHIP REQUIREMENTS	S9074-AR-GIB-010/278, SECTION 7	0900-LP-001-7000, SECTION 5	S9074-AR-GIB-010/278, SECTIONS 7 AND 11.6	S9074-AR-GIB-010/278, SECTION 7	S9221-C1-GTP-010/020	S9074-AR-GIB-010/278, SECTION 7
9	VISUAL INSPECT JOINT FIT-UP	S9074-AR-GIB-010/278, SECTION 9 MIL-STD-22 Not Required for P2	0900-LP-001-7000, SECTION 7 FOR CLASS P-3a SPECIAL CATEGORY	NOT APPLICABLE	S9074-AR-GIB-010/278, SECTION 9 MIL-STD-22	S9221-C1-GTP-010/020	DOD-STD-2185, SECTION 5
10	VISUAL INSPECTION	S9074-AR-GIB-010/278, SECTION 10 MIL-STD-2035, SECTION 4	0900-LP-001-7000, SECTION 7 AND 8 FOR CLASS P-3a SPECIAL CATEGORY	S9074-AR-GIB-010/278, SECTION 11.6.3 MIL-STD-2035, SECTION 4	S9074-AR-GIB-010/278, SECTION 10 MIL-STD-2035, SECTION 4		MIL-STD-2035, SECTION 4
11	RADIOGRAPHIC INSPECTION (RT)	S9074-AR-GIB-010/278 SECTION 10 T9074-AS-GIB-010/271, SECTION 3 MIL-STD-2035, SECTION 5 (NORMALLY ONLY P-1 AND P-LT)	NOT APPLICABLE		S9074-AR-GIB-010/278 SECTION 10 T9074-AS-GIB-010/271, SECTION 3 MIL-STD-2035, SECTION 5		NOT APPLICABLE

* - PARAGRAPH 3.4.4 APPLIES
** - PARAGRAPH 3.***10*** APPLIES

TABLE 1
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

LINE	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
12	ULTRASONIC INSPECTION (UT)	NOT APPLICABLE	0900-LP-001-7000, SECTIONS 6,7,8 AND 9 FOR CLASS P-3a SPECIAL CATEGORY PIPING ONLY	NOT APPLICABLE			S9245-AR-TSM-010/PROP, SECTION 5-7.5.2
13	LIQUID PENETRANT INSPECTION (PT)	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7 (NORMALLY ONLY P-1 AND P-LT)	0900-LP-001-7000, SECTION 7 AND 8 FOR CLASS P-3a SPECIAL CATEGORY SEE 3.4.2.2	S9074-AR-GIB-010/278, SECTION 11.6.3 MIL-STD-2035, P SECTION 7	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7		MIL-STD-2035, PARAGRAPH 7 T9074-AS-GIB-010/271, SECTION 5
14	MAGNETIC PARTICLE INSPECTION (MT)	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, SECTION 6 (NORMALLY ONLY P-1 AND P-LT)	NOT APPLICABLE		S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035 SECTION 6		NOT APPLICABLE

* - PARAGRAPH 3.4.4 APPLIES
** - PARAGRAPH 3.***10*** APPLIES

TABLE 1
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

LINE	COLUMN	F	G	H	I	J
	SITUATION EVOLUTION	MACHINERY CLASS M	TURBINE PARTS	CASTINGS	FORCED DRAFT BLOWERS	REDUCTION AND STEAM TURBINE DRIVEN AUXILIARY GEARS
1	WELDER AND BRAZER QUALIFICATIONS	S9074-AQ-GIB-010/248, SECTION 5				
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, SECTION 4				
3	BRAZING PROCEDURE	NOT APPLICABLE				
4	WELDING REQUIREMENTS	S9074-AR-GIB-010/278, SECTION 6				
5	FILLER MATERIAL	S9074-AR-GIB-010/278, SECTION 5				
6	JOINT DESIGN	S9074-AR-GIB-010/278, SECTION 9, AND MIL-STD-22				
7	HEAT TREATMENT	S9074-AR-GIB-010/278, SECTIONS 6 AND 8				
8	WORKMANSHIP REQUIREMENTS	S9074-AR-GIB-010/278, SECTION 7				
9	VISUAL INSPECT JOINT FIT-UP	S9074-AR-GIB-010/278, SECTION 10, AND MIL-STD-22				
10	VISUAL INSPECTION	S9074-AR-GIB-010/278, SECTION 10 MIL-STD-2035, SECTION 4	S9074-AR-GIB-010/278, SECTION 14	S9074-AR-GIB-010/278, SECTION 13 MIL-STD-2035, SECTION 4	S9074-AR-GIB-010/278, SECTION 16	S9074-AR-GIB-010/278, SECTION 15
11	RADIOGRAPHIC INSPECTION (RT)	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 3 MIL-STD-2035, SECTION 5	S9074-AR-GIB-010/278, SECTION 14 T9074-AS-GIB-010/271, SECTION 3 MIL-STD-2035, SECTION 5	S9074-AR-GIB-010/278, SECTION 13	S9074-AR-GIB-010/278, SECTION 16 T9074-AS-GIB-010/271, SECTION 3 MIL-STD-2035, SECTION 5	NOT APPLICABLE

TABLE 1
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

LINE	COLUMN	F	G	H	I	J
	SITUATION EVOLUTION	MACHINERY CLASS M	TURBINE PARTS	CASTINGS	FORCED DRAFT BLOWERS	REDUCTION AND STEAM TURBINE DRIVEN AUXILIARY GEARS
12	ULTRASONIC INSPECTION (UT)	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, SECTION 6 MIL-STD-2035, SECTION 8	S9074-AR-GIB-010/278, SECTION 14	S9074-AR-GIB-010/278, SECTION 13	S9074-AR-GIB-010/278, SECTION 16	S9074-AR-GIB-010/278, SECTION 15
13	LIQUID PENETRANT INSPECTION (PT)	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7	S9074-AR-GIB-010/278, SECTION 14 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7	S9074-AR-GIB-010/278, SECTION 13 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7	S9074-AR-GIB-010/278, SECTION 16 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7	S9074-AR-GIB-010/278, SECTION 15 T9074-AS-GIB-010/271, SECTION 5 MIL-STD-2035, SECTION 7
14	MAGNETIC PARTICLE INSPECTION (MT)	S9074-AR-GIB-010/278, SECTION 10 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, SECTION 6	S9074-AR-GIB-010/278, SECTION 14 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, SECTION 6	S9074-AR-GIB-010/278, SECTION 13 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, PARAGRAPH 6	S9074-AR-GIB-010/278, SECTION 16 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, SECTION 6	S9074-AR-GIB-010/278, SECTION 15 T9074-AS-GIB-010/271, SECTION 4 MIL-STD-2035, SECTION 6

TABLE 2
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (COMBATANT)

LINE	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS), ORDINARY STRENGTH STEEL(OS), AND HIGHER STRENGTH STEEL (HSS)	(HY-80/100, HSLA-80 AND STS)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	S9074-AQ-GIB-010/248, PARAGRAPH 5					
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, PARAGRAPH 4					
3	ELECTRODE	MIL-STD-1689, SECTION 10 TABLE X	MIL-STD-1689, SECTION 10 TABLE XI	MIL-STD-1689, SECTION 10 TABLE XVI	MI-STD-1689, SECTION 10 TABLES XII AND XIII	MIL-STD-1689, SECTION 10 TABLES XIV AND XV	S9074-AR-GIB-010/278, TABLE II
4	JOINT DESIGN	MIL-STD-22 MIL-STD-1689, SECTION 11					
5	WELDING REQUIREMENTS	MIL-STD-1689, SECTION 13					
6	WORKMANSHIP REQUIREMENTS	MIL-STD-1689, SECTIONS 12 AND 14					
7	VISUAL	MIL-STD-1689, SECTIONS 6, 7, AND 8 MIL-STD-2035, SECTION 4 T9074-AS-GIB-010/271, SECTION 8					
8	RADIOGRAPHIC INSPECTION (RT)	MIL-STD-1689, SECTIONS 6, 7, AND 8 MIL-STD-2035, SECTION 5 T9074-AS-GIB-010/271, SECTION 3					

PARAGRAPH 3.8 APPLIES

TABLE 2
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (COMBATANT)

LINE	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS), ORDINARY STRENGTH STEEL(OS), AND HIGHER STRENGTH STEEL (HSS)	(HY-80/100, HSLA-80 AND STS)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
9	ULTRASONIC INSPECTION (UT)	MIL-STD-1689, SECTIONS 6, 7, AND 8 MIL-STD-2035, SECTION 8 T9074-AS-GIB-010/271, SECTION 6					
10	LIQUID PENETRANT INSPECTION (PT)	MIL-STD-1689, SECTIONS 6, 7, AND 8 MIL-STD-2035, SECTION 7 T9074-AS-GIB-010/271, SECTION 5					
11	MAGNETIC PARTICLE INSPECTION (MT)	MIL-STD-1689, SECTION 6 MIL-STD-2035, SECTION 6 T9074-AS-GIB-010/271, SECTION 4		NOT APPLICABLE			

PARAGRAPH 3.8 APPLIES

TABLE 3
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (NON-COMBATANT) * **

LINE	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS), ORDINARY STRENGTH STEEL(OS), AND HIGHER STRENGTH STEEL (HSS)	*** (HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
2	WELDING PROCEDURE	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
3	ELECTRODE	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
4	JOINT DESIGN	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
5	WELDING REQUIREMENTS	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
6	WORKMANSHIP REQUIREMENTS	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
7	VISUAL	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
8	RADIOGRAPHIC INSPECTION (RT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					

TABLE 3
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (NON-COMBATANT) * **

LINE	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS), ORDINARY STRENGTH STEEL(OS), AND HIGHER STRENGTH STEEL (HSS)	*** (HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
9	ULTRASONIC INSPECTION (UT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
10	LIQUID PENETRANT INSPECTION (PT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
11	MAGNETIC PARTICLE INSPECTION (MT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1		NOT APPLICABLE			

* - IDENTIFICATION OF "SURVEYOR" IN ABS RULES SIGNIFIES SUPERVISOR OF SHIPBUILDING (SUPERVISOR) ACTION. THE SUPERVISOR MAY USE MIL-STD-1689 FOR GUIDANCE WHERE ADDITIONAL DIRECTION IS NECESSARY. SUCH GUIDANCE MAY BE USED TO: ESTABLISH NDT REQUIREMENTS, ESTABLISH WELDING/NDT PROCEDURE AND PERSONNEL QUALIFICATION REQUIREMENTS, OR TO DEFINE OTHER ATTRIBUTES LISTED IN THE "MATERIAL EVOLUTION" LINE OF TABLE 3.

** - THE SUPERVISOR MAY ALSO ALLOW THE SHIPBUILDER TO CHOOSE FROM THE FOLLOWING OPTIONS, PROVIDING:

- THE SHIPBUILDER'S UTILIZATION OF THE FOLLOWING OPTIONS ***MUST*** RESULT IN NO ADDITIONAL COST TO THE GOVERNMENT.
- THE SHIPBUILDER ***MUST*** UTILIZE THE FABRICATION DOCUMENT SELECTED FOR THE ENTIRE AVAILABILITY AND ***MUST*** NOT SWITCH BACK AND FORTH BETWEEN DOCUMENTS.
- THE SHIPBUILDER ***MUST*** NOTIFY THE SUPERVISOR OF WHICH FABRICATION DOCUMENT HAS BEEN SELECTED.

OPTIONS:

A) MIL-STD-1689 MAY BE UTILIZED BY THE SHIPBUILDER AT THE SHIPBUILDER'S DISCRETION. THE REQUIREMENTS OF TABLE 2 ABOVE WOULD THEN APPLY.

B) FOR DETERMINATION OF NDT METHOD(S) AND EXTENT OF NDT INSPECTION WHEN REPAIRS ARE TO BE ACCOMPLISHED, THE SHIPBUILDER MAY REQUEST TO UTILIZE THE SAME NDT REQUIREMENTS THAT WERE INVOKED IN CONSTRUCTION OF THE VESSEL. IN SUCH CASES, THE SHIPBUILDER ***MUST*** BE RESPONSIBLE TO DETERMINE THE ORIGINAL NDT REQUIREMENTS AND SUBMIT EVIDENCE SUCH AS DRAWINGS OR SPECIFICATIONS WHICH DETAIL THE REQUIREMENTS TO THE SUPERVISOR ALONG WITH A REQUEST FOR APPROVAL.

C) THE SHIPBUILDER MAY REQUEST TO UTILIZE PRE-ESTABLISHED WELDING AND/OR NDT PROCEDURES AND PERSONNEL QUALIFICATION PROGRAM(S) WHICH HAVE BEEN PREVIOUSLY UTILIZED IN THE PERFORMANCE OF SIMILAR ABS-ACCEPTED WORK. IN SUCH CASES, THE SHIPBUILDER ***MUST*** SUBMIT EVIDENCE OF SUCH ABS ACCEPTABILITY TO THE SUPERVISOR ALONG WITH DESCRIPTIVE DETAILS AND SUPPORTING DOCUMENTATION FOR THE PROPOSED PROGRAM(S). SUCH DOCUMENTATION ***MUST*** INCLUDE THE WELDING/NDT PROCEDURES AND METHODS OF WELDING/NDT PERSONNEL QUALIFICATION THAT WERE UTILIZED IN FORMER ABS-ACCEPTED WORK. THE SHIPBUILDER ***MUST*** ALSO SUBMIT OTHER SUPPORTING EVIDENCE THAT MAY BE REQUESTED BY THE SUPERVISOR TO ESTABLISH THAT THE PROPOSED PROGRAMS HAVE BEEN PREVIOUSLY UTILIZED FOR SIMILAR ABS-ACCEPTED WORK.

*** - PARAGRAPH 3.8 APPLIES.

TABLE 4
WELDING, FABRICATION, AND INSPECTION OF METAL BOAT AND CRAFT HULLS

LINE	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS)	(HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	S9074-AQ-GIB-010/248, SECTION 5					
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, SECTION 4					
3	ELECTRODE	0900-060-4010, SECTION 10, TABLE 10-1	0900-060-4010, SECTION 10, TABLES 10-2 AND 10-3	0900-060-4010, SECTION 10, TABLE 10-7	0900-060-4010, SECTION 10, TABLE 10-4	0900-060-4010 SECTION 10, TABLES 10-5 AND 10-6	S9074-AR-GIB-010/278, TABLE II
4	JOINT DESIGN	MIL-STD-22 0900-060-4010, SECTION 11					
5	WELDING REQUIREMENTS	0900-060-4010, SECTION 13					
6	WORKMANSHIP REQUIREMENTS	0900-060-4010, SECTIONS 12 AND 14					
7	VISUAL	0900-060-4010, SECTIONS 6, 7, AND 8 T9074-AS-GIB-010/271, SECTION 8					
8	RADIOGRAPHIC INSPECTION (RT)	0900-060-4010, SECTION 6, TABLE 6-1 AND SECTIONS 7 AND 8 T9074-AS-GIB-010/271, SECTION 3					
9	ULTRASONIC INSPECTION (UT)	T9074-AS-GIB-010/271, SECTION 6					
10	LIQUID PENETRANT INSPECTION (PT)	0900-060-4010, SECTIONS 6, 7, AND 8 T9074-AS-GIB-010/271, SECTION 5					
11	MAGNETIC PARTICLE INSPECTION (MT)	0900-060-4010 SECTION 6 T9074-AS-GIB-010/271, SECTION 4		NOT APPLICABLE			

ATTACHMENT A

COMBATANT SURFACE SHIPS

WARSHIPS		TABLE
Aircraft Carriers:		
Aircraft Carrier	CV	2
Aircraft Carrier (nuclear propulsion)	CVN	2
Surface Combatants:		
Guided Missile Cruiser	CG	2
Guided Missile Destroyer	DDG	2
Guided Missile Frigate	FFG	2
Littoral Combat Ship	LCS	2
Patrol Combatants:		
Patrol Coastal	PC	4
AMPHIBIOUS WARFARE SHIPS		
Amphibious Command Ship	LCC	2
Amphibious Assault Ship (general purpose)	LHA	2
Amphibious Cargo Ship	LKA	2
Amphibious Transport Dock	LPD	2
Dock Landing Ship	LSD	2
Amphibious Assault Ship (general purpose)	LHD	2
AUXILIARY SHIPS		
Oiler	AO	2
Fast Combat Support Ship	AOE	2
MINE WARFARE SHIPS		
Mine Countermeasures Ship	MCM	2

ATTACHMENT A
(Con't)

COMBATANT CRAFT

AMPHIBIOUS WARFARE CRAFT TABLE

Improved Navy lighterage system .....(INLS) 4
Landing Craft, Air Cushion .....LCAC. 4
Landing Craft, Mechanized .....LCM. 4
Landing Craft, Personnel, Large .....LCPL. 4
Landing Craft, Utility .....LCU. 2

Light Seal Support Craft .....LSSC. 4
Amphibious Warping Tug .....LWT. 4
Maritime Prepositioning Force Utility Boat .....MPFUB.....4
Medium Seal Support Craft .....MSSC. 4
Swimmer Delivery Vehicle .....SDV. 4
Side Loading Warping Tug .....SLWT. 4
Special Warfare Craft, Light .....SWCL. 4
Special Warfare Craft, Medium .....SWCM. 4

PATROL CRAFT

Mini-Armored Troop Carrier .....ATC. 4
Multi-Use EOD Response Craft .....MERC.....4
Patrol Boat .....PB. 4
River Patrol Boat .....PBR. 4
Riverine Assault Boat .....RAB.....4
Riverine Command Boat.....RCB.....4

SPECIAL WARFARE CRAFT

Dive Support Boat ..... DSB.....4
Combatant Craft Assault ....CCA.....4
Combatant Craft Medium.....CCM.....4
Combatant Craft Heavy.....CCH.....4
Seal Delivery Vehicle .....SDV.....4
Special Operations Craft-Riverine.....SOC-R.....4
Shallow Water Combat Submersible .....SWCS.....4
Surface Support Craft .....SSC.....4

NON-COMBATANT SURFACE SHIPS

AUXILIARY SHIPS

Auxiliary Crane Ship .....ACS 3
Missile Range Instrumentation Ship .....AGM. 3
Oceanographic Research Ship .....AGOR. 3
Ocean Surveillance Ship .....AGOS. 3

Surveying Ship .....AGS. 3

ATTACHMENT A
(Con't)

Hospital Ship .....AH. 3
Cargo Ship .....AK. 3
Auxiliary Cargo Barge/Lighter Ship .....AKB. 3
Auxiliary Cargo Float-On/Float-Off Ship .....AKF. 3
Transport Oiler .....AOT. 3
Barracks Craft .....APL. 3
Cable Repairing Ship .....ARC. 3
Salvage Ship .....ARS. 3
Submarine Tender .....AS. 3
Fleet Ocean Tug .....ATF. 3
Aviation Logistic Support Ship .....AVB. 3

NON-COMBATANT SURFACE CRAFT

SERVICE CRAFT TABLE

Small Auxiliary Floating Dry Dock (non-self-propelled) ...AFDL... 3
Medium Auxiliary Floating Dry Dock (non-self-propelled) ..AFDM... 3
Medium Auxiliary Repair Dry Dock (non-self-propelled) ....ARDM... 3
Causeway Section, Powered .....CSP... 3
Causeway Section (non-self-propelled) .....CSNP... 3
Unclassified Miscellaneous .....IX... 3
Open Lighter (non-self-propelled) .....YC... 3
Aircraft Transportation Lighter (non-self-propelled) .....YCV... 3
Cargo Semi-Submersible Barge .....YCSS... 3
Floating Crane (non-self-propelled) .....YD... 3
Diving Tender (non-self-propelled) .....YDT... 3
Ferryboat or Launch (self-propelled) .....YFB... 3
Covered Lighter (non-self-propelled) .....YFN... 3
Large Covered Lighter (non-self-propelled) .....YFNB... 3
Dry Dock Companion Craft (non-self-propelled) .....YFND... 3
Lighter (special purpose) (non-self-propelled) .....YFNX... 3
Floating Power Barge (non-self-propelled) .....YFP... 3
Salvage Lift Craft, Light .....YLC... 3
Gasoline Barge (non-self-propelled) .....YOGN... 3
Fuel Oil Barge (non-self-propelled) .....YON... 3
Oil Storage Barge (non-self-propelled) .....YOS... 3
Patrol Craft (self-propelled) .....YP... 4
Floating Workshop (non-self-propelled) .....YR... 3
Repair and Berthing Barge (non-self-propelled) .....YRB... 3
Repair, Berthing and Messing Barge (non-self-propelled) ..YRBM... 3
Floating Dry Dock Workshop (hull) (non-self-propelled) ...YRDH... 3
Floating Dry Dock Workshop (machine) (non-self-propelled) YRDM... 3
Radiological Repair Barge (non-self-propelled) .....YRR... 3
Seaplane Wrecking Derrick (self-propelled) .....YSD... 3
Large Harbor Tug .....YTB... 4
Small Harbor Tug .....YTL... 4
Torpedo Trials Craft .....YTT... 4
Water Barge (non-self-propelled) .....YWN... 3

SUPPORT CRAFT

Aircraft Rescue Boat	***AR***	***4***
Area Search Boat	***AS***	***3***
Armored Troop Carrier	***AT***	***3***
Barrier Boat	***BB***	***3***
Boom Platform Boat	***BP***	***3***
Dynamic Inclined Plane Oil Skimmer Boat	***DP***	***3***
Dive Support	***DS***	***3***
Dive Workboat	***DW***	***3***
Harbor Security Boat	***DW***	***3***
Marine Mammal Boat	***MM***	***3***
Missile Retriever Boat	***MR***	***3***
Non-Standard Boat	***NS***	***4***
Oil Pollution Skimmer Boat	***OP***	***4***
Parasail Training Boat	***PS***	***4***
Riverine Assault Boat	***RAB***	***4***
Riverine Command Boat	***RCB***	***4***
Riverine Patrol Boat	***RPB***	***4***
Support Craft	***SC***	***4***
Ships Non-Standard Boat	***SX***	***4***
Torpedo Retriever Boat	***TR***	***4***
Utility Boat	***UB***	***4***
Unmanned Craft	***UC***	***4***
Work Boat	***WB***	***4***
Work Platform Boat	***WP***	***4***
Warping Tug	***WT***	***4***

NOTES:

Letter prefixes to classification symbols may add identification:

E -- Prototype ship or craft in an experimental or developmental status.
T -- Assigned to MSC (Military Sealift Command)
F -- Being Constructed for a foreign government.
X -- Often added to existing classifications to indicate a new class whose characteristics have not been defined.